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14 March 1957

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Dear Dick:

We are forwarding herewith eight copies of Monthly Progress Letter No. 8, covering work performed on System No. 4 during the period extending from 1 January 1957 to 1 February 1957.

Sincerely,



Burt

Enclosures:

CMCC Doc. No. 163X5.31
Copies 1-8 of 12

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Monthly Progress Letter No. 8

Contract No. A-101

System 4

1 January 1957 to 1 February 1957

CMCC Document No. 163X5.31

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(This document contains a total of 5 sheets,
including this title sheet.)

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1. General

During the period covered by this progress letter, the fabrication of the prototype system was essentially completed and subassemblies were subjected to unit tests. Specifications were established for the engineering tests to be carried out on prototype equipment prior to their release for flight test. The following paragraphs describe the details of the progress achieved in the fabrication of the System 4 prototype.

2. Antennas

The fabrication of all antennas was completed and patterns measured to determine conformance to specifications. Test specifications were established for evaluating cable losses, VSWR's, and matching losses in coupling networks.

3. Receivers

a. Except for the band I receiver, all receiving equipments were completed and subjected to unit test. However, the fabrication and testing of most of the subassemblies for the band I receiver were completed and the prototype should be completed and tested during the next monthly reporting interval.

b. In addition, engineering specifications were established for testing and evaluating the following parameters of each receiver prior to release for field test.

- (1) over-all bandwidth
- (2) over-all sensitivity (tangential and lock-on)
- (3) spurious response susceptibility
- (4) agc characteristics
- (5) slewing and afc characteristics

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- (6) characteristics of audio and video output devices
- (7) effect of power supply variations on receiving equipment performance.

4. Terminal Equipment

a. Audio Programming Equipment

The fabrication of all audio programming equipment was completed and all units were tested. Engineering tests were established to evaluate the following performance characteristics of the audio programming equipment.

- (a) performance of equalization networks for tape transport
- (b) conformance of demodulator units for bands VIII through X to specifications -- especially with regard to pulse-stretcher threshold performance, CW channel threshold performance, and over-all dynamic range
- (c) performance of agc recording facility -- especially with regard to frequency response, dynamic range, and cross-modulation
- (d) performance of the digital data track -- especially with regard to cross-modulation between tone channels
(Because a large number of solid state devices are used, performance will be checked over a wide temperature range.)

b. Camera/Indicator and Video Programmer

The camera/indicator and video programmer are to be tested as a single unit. Fabrication of these equipments was completed during this period and engineering testing will include the following:

- (a) complete check of the video recording capability for each video channel

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- (b) evaluation of cross-talk
- (c) evaluation of all miscellaneous permutations in operating logic such as different overlays on the first and second indicator sweeps
- (d) evaluation of cross-talk in video channels
- (e) investigation of equipment performance over a wide temperature range.

c. Tape Transport

Fabrication and testing of the tape transport was completed during the interval covered by this letter and engineering tests were established as follows:

- (a) Mechanical tests are required to determine satisfactory performance during wind and re-wind at the rated speed when a full reel is in use. These tests will be conducted over a wide temperature range.
- (b) Electrical tests will be performed to determine the frequency response, linearity, distortion, and flutter and wow for each of the tape tracks.

5. Power Supply Equipment

During the interval covered by this letter, the fabrication of the power supply was completed and specifications pertaining to load, allowable ripple, load fluctuations, and primary power supply voltage regulations were established for all power supply units. Engineering tests will be made to determine conformance of all units to these specifications. Measurements will be made after sustained operation for at least six hours under load. These tests will be conducted at normal altitude and at an effective altitude of 30,000 feet, or above.

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6. System Rack

The system rack and interunit cabling was completed. Fuses were temporarily included on the rack to provide protection during the initial system tests. However, fuses will be included within individual production equipments, rather than on the rack.

7. Planning

- a. During the next monthly interval, the major effort will be directed toward completing the engineering tests described above, evaluating system performance on the basis of these tests, and modifying equipments as required.
- b. Present scheduling calls for the delivery, by mid February, of a minimum operational system consisting of three super-heterodyne receivers (probably bands II, V, and VII), the video recorder, consisting of the camera/indicator and video programmer, all audio circuits relating to audio recording as well as agc and digital data track recording, the system power supply, and all antennas. The remaining receiving equipments are to be supplied to the field as soon as they meet engineering test specifications.

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